

REMARKS

The following remarks address rejections and comments made in the Office Action mailed March 24, 2008. Claims 1-19 are currently pending. Claims 3 and 13 were amended, and no claims have been cancelled. In light of the foregoing amendments and the following remarks, the applicants respectfully request reconsideration of the present case in view of the following remarks.

Claim Objections

Claims 3 and 13 were objected to because of typographical errors in the term “rendering.” The applicants thank the examiner for noting this error and have amended the claims accordingly. These amendments do not narrow the scope of the claims in any way.

Anticipation Rejection under 35 U.S.C. § 102

Claims 1-3, 5, 7-13 and 17-19 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Boernert et al. (US 6,317,619). Applicants respectfully traverse this rejection, and do not concede any characterization of the cited reference or the pending application set forth in the Office Action.

Claim 1 (and hence dependent claims 2-3, 5, 7-13, 17, and 18) sets forth, “producing a volume rendering from the MRI data in real time with respect to the act of collecting MRI data representative of shapes within the image volume.” Claim 19 similarly sets forth, “a computer . . . configured to receive the MRI data from the MRI scanner and to produce a volume rendering from the MRI data in real time with respect to the act of collecting the MRI data.”

In sharp contrast, Boernert does not disclose rendering a volume (i.e., containing perspective, interactive rotation, etc.) in real time with respect to the act of collecting MRI data. In fact, it does not disclose rendering a volume at all.

Boernert describes an MRI system containing movable receiver coils and is focused on determining the location and orientation of those receiver coils and producing images in the region of sensitivity of the receiver coils. It provides some of the functionality of an ultrasound system, where a user can move the imaging probe to change the scan region. The 3D position and orientation of the receiver coil is made known to the scanner so that it may move the imaging slice in real-time to the location of the movable coil. Wherever Boernert discusses 3D it

is in the context of determining the position and orientation of the receiver coils. Wherever it discusses a volume, it is in the context of the region from which data is collected for imaging—not that a volume rendering is created from 3D data. Boernert does not describe rendering a volume image, much less a low-latency creation of a volume rendering from real-time reconstruction of 3D imaging data.

Therefore, Boernert does not disclose all of the elements set forth in the claims. The applicants respectfully submit that claims 1-3, 5, 7-13 and 17-19 are patentably distinct from Boernert and request withdrawal of the pending rejection.

Obviousness Rejections under 35 U.S.C. § 103

Boernert in view of NessAiver

Claims 4 and 6 stand rejected under 35 U.S.C. § 103(a) as being obvious over Boernert in view of NessAiver (US 5,329,925). Applicants respectfully traverse the rejection, and do not concede any characterizations of the cited reference or the pending application set forth in the Office Action.

Claims 4 and 6 depend from claim 1 and include the element, “producing a volume rendering from the MRI data in real time with respect to the act of collecting MRI data representative of shapes within the image volume.”

As discussed above, Boernert fails to teach or suggest producing a volume rendering in real time with respect to collecting MRI data. NessAiver also fails to teach or suggest this element. NessAiver is directed to reducing scan time of magnetic resonance cine images, but does not teach or suggest producing volume renderings or producing such renderings in real time with respect to the collection of data.

Therefore, no combination of Boernert and NessAiver can result in the claimed invention. The applicants respectfully submit that claims 4 and 6 are not obvious in view of these cited references and request withdrawal of the pending rejection.

Boernert in view of Pfister

Claims 14 and 15 stand rejected under 35 U.S.C. § 103(a) as being obvious over Boernert in view of Pfister (Architectures for real-time volume rendering, 15 Future Generation Computer Systems 1-19 (1999)). Applicants respectfully traverse the rejection, and do not concede any characterizations of the cited reference or the pending application set forth in the Office Action.

Claims 4 and 6 depend from claim 1 and include the element, “producing a volume rendering from the MRI data in real time with respect to the act of collecting MRI data representative of shapes within the image volume.”

As discussed above, Boernert fails to teach or suggest rendering a volume in real time with respect to collecting MRI data. Pfister also fails to teach or suggest this element. Pfister is directed to mapping texture on volume renderings. With respect to real time, the only disclosure is at col. 2, lines 14-18, which states only that hardware accelerators aim to provide real-time frame rates when operating on previously collected data — not that it provides real-time volume renderings with respect to MRI data collected in real time. Nor does it teach how the system would achieve real-time frame rates.

Therefore, no combination of Boernert and Pfister can result in the claimed invention. The applicants respectfully submit that claims 14 and 15 are not obvious in view of these cited references and request withdrawal of the pending rejection.

Boernert in view of Deering

Claims 15 and 16 stand rejected under 35 U.S.C. § 103(a) as being obvious over Boernert in view of Deering et al. (US 6,417,861). Applicants respectfully traverse the rejection, and do not concede any characterizations of the cited reference or the pending application set forth in the Office Action.

Claims 15 and 16 depend from claim 1 and include the element, “producing a volume rendering from the MRI data in real time with respect to the act of collecting MRI data representative of shapes within the image volume.”

As discussed above, Boernert fails to teach or suggest rendering an image in real time with respect to collecting MRI data. Deering also fails to teach or suggest this element. If fact, Deering teaches away from the claimed invention. Deering teaches a graphics architecture that constructs images from previously acquired data. Real-time for the Deering architecture is a function performed at or near the refresh rate of a display device, col. 4, lines 35-37, not with respect to the collection of data. It does not make any disclosure about magnetic resonance imaging or MRI data.

Therefore, no combination of Boernert and Deering can result in the claimed invention. The applicants respectfully submit that claims 15 and 16 are not obvious in view of these cited references and request withdrawal of the pending rejection.

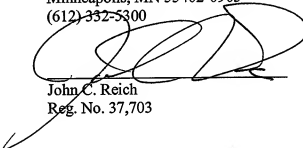
SUMMARY

In view of the foregoing amendments and remarks, the applicants respectfully submit that the pending claims are allowable over the cited references and request issuance of a Notice of Allowance. The applicants also note that there may be reasons and arguments that the pending claims are allowable in addition to those discussed herein and reserve the right to raise any such reason or argument in the future. Please contact the undersigned attorney with any questions regarding this application.

Respectfully submitted,

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